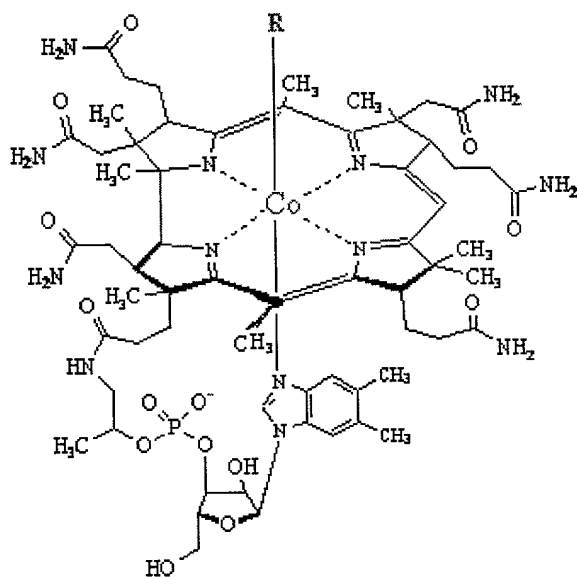


The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

1. A method for treating or preventing a disease or disorder in a mammal caused by ultraviolet radiation, comprising administering an effective amount of vitamin B12 having the formula



wherein R is OH, CN, NO₂, CH₃, or 5'-deoxy-adenosyl, or a derivative of any of the foregoing.

2. The method of claim 1, wherein the vitamin B12 is administered topically.
3. The method of claim 1, wherein the vitamin B12 is administered orally, parenterally, enterally, entranasally, rectally or ocularly.
4. The method of claim 3, wherein the vitamin B12 is administered in a dietetic composition.
5. The method of claim 2 or 3, wherein the vitamin B12 is administered before, during or after the mammal is exposed to ultraviolet radiation.
6. The method of claim 2, wherein the vitamin B12 is administered in a sunscreen composition comprising vitamin B12 and a carrier or excipient.

7. The method of claim 6, wherein the carrier comprises a lipid.
8. The method of claim 6, wherein the carrier comprises an ester.
9. The method of claim 8, wherein the ester comprises an ester of para-aminobenzoate selected from the group consisting of ocytl- and dimethyl-para-aminobenzoic acid.
10. The method of claim 6, wherein the carrier comprises a solid or liquid inert diluent.
11. The method of claim 10, wherein the carrier comprises water, a gas, a water-based liquid, an oil, a gel, an emulsion, a dispersion or a mixture thereof.
12. The method of claim 6, wherein the composition further comprises at least one compound selected from the group consisting of para-aminobenzoic acid, salicyclate, cinnamate, benzophenone, anthranilate, dibenzoylmethane, beta-carotene, alpha- hydroxy acids, titanium dioxide and padimate-o.
13. The method of claim 6, wherein the composition further comprises at least one cosmetically acceptable adjuvant or additive selected from the group consisting of a preservative, organic solvent, browning agent, antioxidant, stabilizer, emollient, silicone, alpha-hydroxy acid, demulcent, anti-foaming agent, moisturizing agent, vitamin, fragrance, ionic or nonionic thickener, surfactant, filler, thickener, sequestrant, polymer, propellant, alkalinizing or acidifying agent, opacifier, fatty compound and a colorant.
14. The method of claim 6, wherein the composition further comprises vitamin B3 or a derivative thereof.
15. The method of claim 14, wherein the vitamin B3 is niacinamide.
16. The method of claim 6, wherein the composition further comprises vitamin B9 or a derivative thereof.
17. The method of claim 16, wherein the vitamin B9 is selected from the group consisting of folic acid, dihydrofolic acid, tetrahydrofolic acid, 5-formyltetrahydrofolic acid, 10-formyltetrahydrofolic acid, 5-10

- methylenetetrahydrofolic acid, 5-10 methenyltetrahydrofolic acid, and 5-methyltetrahydrofolic acid or derivatives thereof.
18. The method of claim 6, wherein the composition further comprises vitamin B3 or a derivative thereof, and vitamin B9 or a derivative thereof.
 19. The method of claim 18, wherein the vitamin B3 is niacinamide and the vitamin B9 is selected from the group comprising folic acid, dihydrofolic acid, tetrahydrofolic acid, 5-formyltetrahydrofolic acid, 10-formyltetrahydrofolic acid, 5-10 methylenetetrahydrofolic acid, 5-10 methenyltetrahydrofolic acid, 5-10 methylenetetrahydrofolic acid or derivatives thereof.
 20. The method of claim 6, wherein the vitamin B12 is present in an amount of about 0.1 mg/ml to 1 mg/ml.
 21. The method of claim 14, wherein the vitamin B3 is present in an amount of about 2 mg/ml to about 100mg/ml.
 22. The method of claim 16, wherein the vitamin B9 is present in an amount of about 0.2 mg/ml to about 10mg/ml.
 23. The method of claim 3, wherein the vitamin B12 is administered as a pharmaceutical composition comprising vitamin B12 and a pharmaceutically acceptable carrier or excipient.
 24. The method of claim 23, wherein the carrier comprises water, gas, a water-based liquid, an oil, a gel, an emulsion, a dispersion or a mixture thereof.
 25. The method of claim 23, wherein the carrier comprises a lipid.
 26. The method of claim 23, wherein the composition further comprises at least one DNA repair enzyme selected from the group consisting of T4 endonuclease or photolyase.
 27. The method of claim 23, wherein the composition is administered as a formulation selected from the group consisting of tablets, dragees, suppositories, capsules, granules, solution, suspensions, and lyophilized compositions.

28. The method of claim 23, wherein the composition further comprises an additive selected from the group consisting of aggregants, disaggregants, osmotic pressure regulating salts, buffers, sweeteners, and coloring agents.
29. The method of claim 23, wherein the composition further comprises a fat-soluble antioxidant selected from the group consisting of ascorbyl palmitate, tocopherols and ascorbic acid in the presence of lecithin.
30. The method of claim 23, wherein the composition is administered as a formulation selected from the group consisting of tablets, dragees, capsules, suppositories, granules, solution, suspension, and lyophilized compositions.
31. The method of claim 23, wherein the composition further comprises vitamin B3 or a derivative thereof.
32. The method of claim 31, wherein the vitamin B3 is niacinamide.
33. The method of claim 23, wherein the composition further comprises vitamin B9 or a derivative thereof.
34. The method of claim 33, wherein the vitamin B9 is selected from the group comprising folic acid, dihydrofolic acid, tetrahydrofolic acid, 5-formyltetrahydrofolic acid, 10-formyltetrahydrofolic acid, 5-10 methylenetetrahydrofolic acid, 5-10 methenyltetrahydrofolic acid and 5-methyltetrahydrofolic acid or derivatives thereof.
35. The method of claim 23, wherein the composition further comprises vitamin B3 or a derivative thereof, and vitamin B9 or a derivative thereof.
36. The method of claim 35, wherein the vitamin B3 is niacinamide and the vitamin B9 is selected from the group comprising folic acid, dihydrofolic acid, tetrahydrofolic acid, 5-formyltetrahydrofolic acid, 10-formyltetrahydrofolic acid, 5-10 methylenetetrahydrofolic acid, 5-10 methenyltetrahydrofolic acid and 5-methyltetrahydrofolic acid or derivatives thereof.

37. The method of claim 23, wherein the amount of vitamin B12 to be administered to an adult is present in an amount of about 0.1mg to about 1.5mg.
38. The method of claim 31, wherein the amount of vitamin B3 to be administered to an adult is present in an amount of about 100mg to about 1g.
39. The method of claim 33, wherein the vitamin B9 to be administered to an adult is present in an amount of about 1mg to about 10mg.
40. The method of claim 23, wherein the amount of vitamin B12 to be administered to a child is present in an amount of about 20ug to about 1.5mg.
41. The method of claim 31, wherein the amount of vitamin B3 to be administered to a child is present in an amount of about 20mg to about 1g.
42. The method of claim 33, wherein the vitamin B9 to be administered to a child is present in an amount of about 200ug to about 10mg.
43. A pharmaceutical composition for use as a sunscreen comprising, vitamin B12 and a pharmaceutically acceptable carrier or excipient.
44. The pharmaceutical composition of claim 43, wherein the carrier comprises a lipid.
45. The pharmaceutical composition of claim 43, wherein the carrier is selected from the group consisting of solid or liquid inert diluents.
46. The pharmaceutical composition of claim 45, wherein the carrier comprises water, a gas, a water-based liquid, an oil, a gel, an emulsion, a dispersion or a mixture thereof.
47. The pharmaceutical composition of any of claims 43, wherein the composition is administered as a formulation selected from the group consisting of tablets, dragees, suppositories, capsules, granules, solution, suspensions, and lyophilized compositions.

48. A pharmaceutical composition comprising vitamin B12, a pharmaceutically acceptable carrier or excipient, and an additive selected from the group consisting of aggregants, disaggregants, osmotic pressure regulating salts, buffers, sweeteners, and coloring agents.
49. A pharmaceutical composition comprising vitamin B12, a pharmaceutically acceptable carrier or excipient and at least one sunfiltering or sunscreensing compound selected from the group consisting of para-aminobenzoic acid, salicylate, cinnamate, benzophenone, anthranilate, dibenzoylmethane, beta-carotene and alpha- hydroxy acids.
50. The pharmaceutical composition of claim 43, further comprising vitamin B3 or a derivative thereof.
51. The pharmaceutical composition of claim 43, further comprising vitamin B9 or a derivative thereof.
52. The pharmaceutical composition of claim 43, further comprising vitamin B3 or a derivative thereof and vitamin B9 or a derivative thereof.
53. The pharmaceutical composition of claim 50, wherein the vitamin B3 is niacinamide and the vitamin B9 is selected from the group consisting of folic acid, dihydrofolic acid, tetrahydrofolic acid, 5-formyltetrahydrofolic acid, 10-formyltetrahydrofolic acid, 5-10 methylenetetrahydrofolic acid, 5-10 methenyltetrahydrofolic acid, and 5-methyltetrahydrofolic acid or derivatives thereof.
54. The pharmaceutical composition of claim 53, wherein the vitamin B12 is present in an amount of about 20ug to about 1.5mg, vitamin B3 is present in an amount of about 20mg to about 1g, and vitamin B9 is present in an amount of about 200ug to about 10mg.
55. A sunscreen composition comprising vitamin B12 and a carrier or excipient.
56. The composition of claim 55, wherein the carrier comprises an ester.

57. The composition of claim 56, wherein the ester comprises an ester of para-aminobenzoate selected from the group consisting of octyl- and dimethyl-para-aminobenzoic acid.
58. The composition of claim 55, wherein the carrier comprises water, a gas, a water-based liquid, an oil, a gel, an emulsion, a dispersion or a mixture thereof.
59. The composition of claim 55, further comprising vitamin B3 or a derivative thereof.
60. The composition of claim 55, further comprising vitamin B9 or a derivative thereof.
61. The composition of claim 55, further comprising vitamin B3 or a derivative thereof and B9 or a derivative thereof.
62. The composition of claim 59, wherein the vitamin B3 is niacinamide and vitamin B9 is selected from the group consisting of folic acid, dihydrofolic acid, tetrahydrofolic acid, 5-formyltetrahydrofolic acid, 10-formyltetrahydrofolic acid, 5-10 methylenetetrahydrofolic acid, 5-10 methenyltetrahydrofolic acid and 5-methyltetrahydrofolic acid and derivatives thereof.
63. The composition of claim 62, wherein the vitamin B12 is present in an amount of about 0.1mg/ml to about 1mg/ml, vitamin B3 is present in an amount of about 2.0mg/ml to about 100mg/ml, and vitamin B9 is present in an amount of about 0.2mg/ml to about 10mg/ml.
64. The composition of claim 55, comprising an oil-in-water emulsion.
65. The sunscreen composition of claim 55, further comprising at least one compound selected from the group consisting of para-aminobenzoic acid, salicylate, cinnamate, benzophenone, anthranilate, dibenzoylmethane, beta-carotene, titanium dioxide, padimate, and an alpha-hydroxy acid.
66. The sunscreen composition of claim 55, further comprising at least one cosmetically acceptable adjuvant or additive.

67. The composition of claims 66, wherein the adjuvant or additive comprises a preservative, organic solvent, browning agent, antioxidant, stabilizer, emollient, silicone, alpha-hydroxy acid, demulcent, anti-foaming agent, moisturizing agent, vitamin, fragrance, ionic or nonionic thickener, surfactant, filler, thickener, sequestrant, polymer, propellant, alkalinizing or acidifying agent, opacifier, fatty compound or colorant.
68. The composition of claim 55, comprising a nonionic vesicle dispersion, emulsion, cream, milk, gel, ointment, suspension, dispersion, powder, solid stick, foam or spray.
69. The composition of claim 55, further comprising makeup.
69. The composition of claim 55, further comprising anhydrous or aqueous solid or paste.
70. The composition of claim 55, further comprising a hair rinse, spray, mist, gel, mousse, shampoo, conditioner, lotion, emulsion and coloring product.
71. The use of the pharmaceutical composition of claims 43, 50, 51, or 52 to treat a disease or disorder selected from the group consisting of disorders of the skin, disorders of the immune system or disorders of the hematopoietic system.
72. The use of the pharmaceutical compositions of claims 43, 50, 51, or 52 to treat a disease or disorder selected from the group consisting of acne vulgaris, actinic keratoses, photodermatitis, photo-induced lupus erythematosus, xeroderma pigmentosum, albinism, photosensitizing effects of a drug, photosensitizing effects of tetracycline, and cancer.